July 23, 2010

Maryland Transportation Authority

Division of Procurement and
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TO ALL PURCHASERS OF CONTRACT DOCUMENTS:

ADDENDUM NO. 2

RE: Contract No. KB 2250-000-002
Francis Scott Key Bridge Light Pole and Luminaire Replacement

Ladies and Gentlemen:

It is important that you acknowledge receipt of this Addendum No. 2 on the referenced contract regardless if you will be bidding or not bidding.

Very truly yours,

Linda McGill, CPPB
Chief Procurement Officer

LM/mdj

Enclosures

Contract No. **KB 2250-000-002**

This will acknowledge receipt of the attached Addendum No. 2.

_____
NAME OF COMPANY

_____ _____
SIGNATURE DATE

THIS SIGNED ADDENDUM ACKNOWLEDGEMENT PAGE SHALL BE RETURNED TO THIS OFFICE VIA **FAX AT 410-537-7801**, ATTENTION: MAGGIE JOHNSON PRIOR TO THE BID OPENING DATE.

IN ADDITION, THIS SIGNED ADDENDUM ACKNOWLEDGEMENT PAGE MUST BE ATTACHED TO THE OUTSIDE COVER OF THE BID BOOK. FAILURE TO DO SO MAY RESULT IN REJECTION OF YOUR BID.

July 23, 2010

Maryland
Transportation
Authority

Martin O'Malley
Governor

Anthony Brown
Lt. Governor

Beverley Swain-Staley
Chairman

Peter J. Basso
Rev. Dr. William C. Calhoun, Sr.
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Ronald L. Freeland
Executive Secretary

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MARYLAND Green Registry MEMBER

TO ALL PURCHASERS OF CONTRACT DOCUMENTS:

ADDENDUM NO. 2

RE: Contract No. KB 2250-000-002
Francis Scott Key Bridge
Light Pole and Luminaire Replacement

Ladies and Gentlemen:

It is important that you acknowledge receipt of this Addendum No. 2 on the referenced contract regardless if you will be bidding or not bidding.

A: The Bid Opening Date for the above referenced contract remains **Tuesday August 3, 2010 by 12 Noon** as per Addendum No.1 dated July 16, 2010.

B: The following changes have been made to the Invitation for Bids.

1. Enclosed are the Pre-Bid Meeting Minutes.
2. Response to Faxed questions through July 12, 2010.
3. Add Pages 054A-054I.

Very truly yours,

Linda McGill, CPPB
Chief Procurement Officer

LM/mdj

THIS SIGNED ADDENDUM ACKNOWLEDGEMENT PAGE MUST BE ATTACHED TO THE OUTSIDE COVER OF THE BID BOOK. FAILURE TO DO SO MAY RESULT IN REJECTION OF YOUR BID.

Pre-bid Meeting Minutes

Contract No. KB 2250-000-002
Light Pole and Luminaire Replacement on Francis Scott Key Bridge

Baltimore County and Baltimore City

June 23, 2010, 10:00 AM

The following people were in attendance:

Alisha Wright	MDTA Procurement
Koudjo Amouzou	MDTA Engineering
Robert McKenzie	MDTA Engineering
Mike Trimmer	MDTA Construction
David Baldwin	Cue Tech, Incorporated
Larry Green	Daniel Consultants, Incorporated
Julianna Kau	Atlantic Industrial Mechanical and Electrical
Mike O'Melvin	Pipes and Wires Services
Stephanie Romeo	Holophane
Paul Valle	P. D. Valle Electric Company, Inc.
John Zizwarek	Atlantic Industrial Mechanical and Electrical

After a round of introductions, Ms. Alisha Wright opened the meeting with the following remarks:

The work to be performed under this contract is located on the Francis Scott Key bridge, a Maryland Transportation Authority ("Authority") facility. The scope of work includes providing labor, equipment, materials, etc. necessary for installing new steel light poles as shown on the contract plans. The work includes, but may not be limited to, the following:

- Remove and dispose of existing lighting poles
- Furnish and install new light poles, bracket arms, brackets, and fillings
- Thoroughly clean junction boxes of debris, and open or repair their drains
- Temporarily seal conduits and drains to prevent blockage
- Sandblast junction boxes to bare metal
- Prime coat junction boxes with industrial primer
- Spray a protective liner to create a new sold vinyl rust-proof junction box
- Remove temporary drain seals
- Install new cables as specified and reinstall all covers with full-sheet live rubber gasket material to prevent entry of runoff water and sweating inside cover

The contract time is **180 calendar days** with **liquidated damages of eight hundred dollars ($800.00) per calendar day.**

The Bid Opening date for the above referenced contract remains **Tuesday August 3, 2010 by 12 Noon** as per Addendum No.1 dated July 16, 2010. Bid packages must be placed in the bid box

located on the first floor of the Engineering Building at 300 Authority Drive, Baltimore, MD 21222, and must consist of one complete bid book and all the required documents. Late bids will not be accepted.

The Authority does not encourage overnight delivery service. However, if a bidder chooses to send a package overnight, the bid should be delivered at least a day in advance to the **Maryland Transportation Authority, Office of Procurement & Statutory Program Compliance, 300 Authority Drive- 1st Floor, Baltimore, MD 21222.** It will be the responsibility of the Contractor to make sure that his/her bid package is placed in the bid box. The outside of the mailed package must clearly identify the Contract Number and mention that it is a bid package.

The minutes from this meeting will be included in addendum #1 and distributed to all purchasers of the bid documents.

Bidders should make sure the Schedule of Prices is filled out accurately and completely. Not doing so may render the bid non-responsive.

It is strongly recommended that contractors review page i, the Notice to Bidders, and page xiv, the Small Business Reserve Procurement, of the invitation to bids prior to submitting a bid on this project.

Following this meeting, all questions should be in writing, addressed to the Project Manager, Mr. Koudjo Amouzou and sent via fax to 410-537-7801. The Authority will accept written questions until **4 PM on July 6, 2010**. Answers to questions will be distributed to all purchasers of bid documents.

There is no MBE goal for this project. **However, this contract does have a Small Business Reserve Procurement.** If a bidder requires assistance with the SBR, please contact Ms. Tonya Wigfall at 410-537-5697.

Ms. Wright drew potential bidders' attention to the fact that a bid bond will be required for this contract. She strongly suggested that the bond amount be entered as 5% (as opposed to a dollar amount) on the bid guarantee and bid bond forms.

Mr. Amouzou announced that Mr. Charles Raycob, FSK facilities administrator, would lead a worksite tour, date to be determined. Subsequent to the meeting, a site visit was scheduled for Wednesday, June 30 at 10 AM.

The meeting was then opened to questions and comments concerning the Contract. The following questions were discussed and responses were provided:

Question: What is the overall scope of the project? Will it replace light poles along the roadway, or light poles on structures, or all of the above?

Answer: The overall scope of the project is to replace all light poles on the Francis Scott Key Bridge only. See Page 017 of Page 115 of the proposal book for more details.

Question: Will any lights at water level, such as navigation lights, be replaced under this contract?

Answer: No.

Question: Will a safety boat be required for this project?

Answer: Yes. Even though there will be no need for the contractor to go under the bridge deck, most of this work will be performed over the waterway.

Question: Will the safety boat be provided at the contractor's expense?

Answer: Yes. See Page 044 of Page 115 of the proposal book category 100 "Maintenance of Navigation and Compliance with State and Federal Regulations."

Question: Special Provision 806.03.05 (pp. 50-1 of the proposal book) states that the contractor will submit photometric data and calculations for the luminaires. Is this data to be submitted in the form of electronic files?

Answer: Yes.

Question: Do the new light poles have to be erected in the exact same locations as the existing ones?

Answer: See contract plans Sheet 5 of 6 and 6 of 6 for locations of new light poles. Mounting bracket for steel parapet can not be moved but mounting bracket for concrete must be moved as shown on plan Sheet 6 of 6.

Question: Will PBEs be required for the site visit?

Answer: No. Our suggestions for safety apparel are the usual items- hardhats, high visibility vests, and work boots.

Question: Does the Authority have a list of safety boat vendors?

Answer: No. MDTA doesn't provide a list of safety boat vendors. It is the responsibility of the contractor to provide safety boat while working on the bridge.

Question: On Page 51, should photocells be placed at each light, at the control box, or whether the lights should be on a timer?

Answer: Photocells at each luminaire will not be necessary. An existing photocell at the control box controls the lighting circuits.

Question: Are individual lights controlled by its own photocells, or is there a master photocell that controls it?

Answer: A master photocell at the control box controls all lights. The photocell exists on the existing control box that will be utilized.

Question: Dual LED drivers, which can extend the lives of lamps, are available. Can it be used in this project?

Answer: Dual LED drivers can be used at the contractors' discretion if the performance is equal to or greater than the applicable specifications. Changes must be submitted to the Engineer for approval.

Question: Who furnishes the poles and lights?

Answer: The contractor shall furnish the new poles as per Sections 806 and 808 of the Special Provisions.

Question: Have any deteriorated poles already been removed and if so, are their bases still intact?

Answer: Yes, some poles have been removed and the condition of the bases varies. The contractor is required to build new bases as shown in the Plans and Specifications.

Question: Will the contractor have to provide lane closures and maintenance of traffic?

Answer: Yes, see Section 104 of the proposal book for more details.

Question: Is the work to be done during normal working hours?

Answer: See Section 104 of the proposal book for allowed work hours and lane closures.

Question: How early can the MOT be set up?

Answer: MOT can be set up at 9:00 A.M. See Section 104 of the proposal book for additional information.

Question: How wide are the roadway shoulders on the bridge?

Answer: There are no shoulders on the Key Bridge. Lane closures will be necessary for this project.

Question: Can more than one lane be closed at the same time?

Answer: Yes, if approved by the Engineer. See Specification Section 104 for additional information.

Question: Where are the parts (poles, luminaires, junction boxes, wire, etc.) to be delivered?

Answer: The parts can be delivered and stored on the grounds of FSK Maintenance south of the bridge as approved by the FSK Administrator.

Question: What is the height of the proposed poles?

Answer: The proposed poles are forty feet, with a two feet bracket arm. See contract plans for more details.

Question: Will the contractor get extra credit if he/she can provide a dual driver light fixture that is suppose to last twice as long as conventional LED lighting?

Answer: The MDTA does not give extra credit for a dual driver light fixture.

Question: Will workers be required to carry Transportation Worker Identification Credential cards?

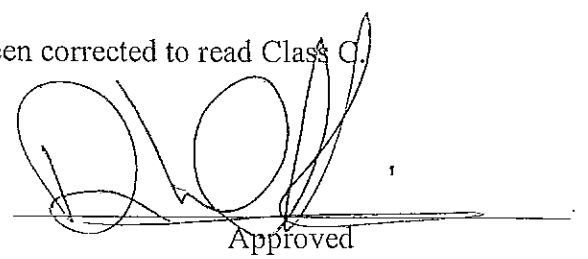
Answer: No.

Question: Do the Department of Labor, Licensing, and Regulation's wage rates apply to contracts of less than $500,000 value?

Answer: See Page 059 of Page 115 for details of DLLR requirements.

Question: In Special Provision SP1-1 (Page 016), this contract is described as a class B contract, and the estimated cost is given as $500,001- $1,000,000. Is this the right amount for a class B contract?

Preliminary Answer: Yes.
Final Answer: Contract documents have been corrected to read Class C.



Faxed in Questions:

Questions submitted by Atlantic Industrial & Mechanical on 7/6/2010

Question: The anchor bolt testing specified on DWG-2 says 4-bolts; will that need to be 4-bolts per mounting brackets?

Answer: A total of four bolts are to be tested for pullout. If any of the tested bolts do not pass the required test, we will assess the failure mode and then issue a directive based on our analysis of field conditions. The bolt testing shall be done in accordance to ASTM E488.

Question: What if the bolt test fails due to concrete integrity?

Answer: Past failures of the poles on this bridge have been all steel related and not concrete related.

Question: Will this test need to be recorded with a written report and/or in the presence of an engineer?

Answer: Yes.

Question: Will there be any other projects taking place during this project?

Answer: Currently, there are ongoing structural repairs on the Key Bridge. Future repair work will be scheduled as needed, inspections or could be routine work as well. When that occurs, the contractor will be required to coordinate work and lane closures.

Question: Can acetylene torches be used to cut off the old bolts? (If we burn on the outboard side of the existing bracket)

Answer: No torch cutting shall be used at existing steel parapet locations. It can be used at the existing concrete parapet as approved by the Engineer.

Question: In regards to boom truck set-up, the outriggers will protrude into the 2nd lane; will two lane closures be allowed?

Answer: Erection equipment selected must remain within a single lane closure. Closure of both lanes in a single direction will not be permitted with the exception of traffic drag as stated in Section 104.

Questions submitted by Stolar Construction Inc. on 7/12/2010

Question: Can you please advise as to which AASHTO Standards the lighting poles are to be manufactured by?

Answer: As noted on Contract plan Sheet 1 of 6, Note#10, the replacement of lighting structures shall conform to SHA Standard 950.07 which details the latest AASHTO wind load and other requirements.

Question: I know this may be a little late in the game here but we have been talking to various agencies, mainly the Coast Guard, as to whether or not some type of permit is required to perform work. No one has been able to help me on this but the spec states the contractor is responsible for all

permits and following rules and regulations. That being said, we are also trying to confirm whether or not they require the contractor to have a work boat as no item has been provided to cover this cost. Can you let me know anything about this?

Answer: As Stated in Subsection 100.01 of the proposal book" Maintenance of Navigation and compliance with State and Federal Regulations" it is the responsibility of the Contractor to comply with the State and Federal regulations. All work is to be done from the bridge deck unless the contractor wishes to construct from the water. No additional compensation will be given; therefore, no work boat item is included. The safety boat shall be part of the "measurement and payment" of this section.

CATEGORY 800

TRAFFIC

SECTION 820 – GENERAL ELECTRICAL WORK AND TESTING

See Section 820 of the SHA's *Standard Specifications for Construction and Materials* in conjunction with the changes shown in this Section.

820.01 DESCRIPTION

ADD: The following.

(a) The Plans show only diagrammatic locations of cables, conduits, and other underground utilities. They are approximate and do not show every detail. The Contractor shall provide working drawings, shop drawings, and catalog cuts, etc., which show final details of the installation.

820.01.01 Codes, Standards, Inspection, and Documentation

(a) All work shall be performed in accordance with the codes and standards listed below. In addition, materials and construction methods shall meet the minimum requirements and recommendations of the listed codes, standards, and organizations. Unless otherwise stated, the latest edition, revision, or supplement, as of the date of advertisement, of the specified codes shall be used.

- ANSI - American National Standards Institute
- ASTM - American Society for Testing and Materials
- IEEE - Institute of Electrical and Electronic Engineers
- NEC - National Electrical Code (NFPA70)
- NECA - National Electrical Contractors Association (NECA 1-2006)
- NEMA - National Electrical Manufacturers Association
- NESC - National Electrical Safety Code
- NFPA - National Fire Protection Association
- UL - Underwriters' Laboratories
- TIA - Telecommunications Industry Association

(b) All materials supplied by the contractor shall be new and UL listed, where such listing is possible. Submit catalog cuts for all materials in accordance with Shop Plans & Working Drawings in SPECIAL PROVISIONS (TC4.01).

(c) The MDTA Chief Electrical Inspector or his appointed representative will inspect the entire installation. The Contractor shall contact the Electrical Inspector at least 48 hours before needed inspections. All trenches shall be inspected before backfilling. All equipment, conduits, etc. shall be inspected at rough in and prior to concealment. All work shall be inspected prior to power-up. Contact the Chief Electrical Inspector, Douglas Evans, at 410-977-2687 or devans3@mdta.state.md.us to arrange necessary inspections.

(d) All rough-in work shall be documented via a digital camera prior to concealment. Camera shall be color, minimum of 5 mega pixels, and images shall be clear and readable to the naked eye. All color photos shall be time stamped with the date of the picture. Filename or other label shall identify project number and general location of the picture. All pictures shall be submitted on a CD or DVD at the conclusion of the project, however, electronic copies shall be made available at any time by request to the project engineer, inspector, and/or electrical inspector.

(e) Special attention is directed to the fact that the Standard Specifications For Construction and Materials dated July 2008 and published by the Maryland Department of Transportation, State Highway Administration, also governs this work, and is referenced frequently herein as the "Specifications."

(f) All work shall be performed in accordance with NECA 1-2006 (Standard for Good Workmanship in Electrical Construction) or latest revision.

(g) Unless clearly specified otherwise, all voltages indicated are AC (alternating current), shall be at 60 Hz, and stated as RMS values.

820.01.02 Quality Assurance and Quality Control

The contractor shall inspect all materials furnished or installed under this contract and shall bring any damage, failure, or other problem to the attention of the project inspector prior to incorporation into the work. The contractor shall provide his own quality assurance and quality control for the work performed in the contract. The inspectors operating on behalf of the state are not a replacement for contractor's management and the contractor's own quality assurance and quality control.

Prior to final inspections/punch list development the contractor shall conduct his own inspections. The use of inspection checklists and quality control documents is required as evidence that inspections have been completed.

820.03 CONSTRUCTION

820.03.01 GENERAL

ADD: The following.

For the purpose of this specification, "direct supervision" shall mean that the qualified Master Electrician shall be at the job site at all times electrical work is performed. The Master Electrician shall be the single point of contact for inspection and quality control issues related to electrical work and shall be able to effectively manage the electrical work force.

The contractor must provide qualified labor to perform installation. Where licenses or certifications are available or required (by local jurisdictions, state jurisdictions, or federal jurisdictions for certain skilled trades, such as electrical, mechanical, plumbing, welding, etc.) workers shall have current and valid licenses or certifications. The skilled trade workers shall have current versions of the appropriate license or certification prior to working the associated specialty and shall provide copies to the Project Engineer or Inspectors upon request.

Installation, splicing, terminating, and testing of fiber optic cable shall be performed by a trained and qualified fiber optic cable technician. Copies of certifications and experience shall be submitted to the Engineer prior to starting work.

ADD: The following just prior to paragraph 820.04.

820.03.04 Testing Fiber Optic Cables

Circuit tests shall be performed to verify that each fiber is connected to the proper circuit, and that it is continuous with no breaks, or damaged sections, in the fiber. All strands shall meet current EIA/TIA-568 specifications. Dark fibers and excessive attenuation due to breaks, bends, bad splices, defective connectors and bad installation practices shall not be accepted and shall be corrected. For fiber optic testing standards, see EIA-455-171 (FOTP-171), EIA 526-14.

(a) All cables shall have ST connectors installed prior to testing. All testing, for purposes of acceptance of the system, shall be conducted on fully installed and assembled fiber optic cables.

(b) Upon completion of testing, replace or repair any failed cable(s) with a new fiber or cable, and test the new cable to demonstrate acceptability.

(c) Insertion loss testing shall be performed.

(d) These tests shall be measured in dB.

(e) These tests shall use 850 nm and 1300 nm light sources for multimode fiber and 1300 and 1550 nm for single mode fiber.

(f) Test shall be documented for all wavelengths as noted above.

(g) Test results shall be documented on paper and stored on a computer diskette and shall be turned over to the electrical inspector after testing is complete. Attachment 820-A to this Section shows a sample fiber optic test report.

(h) An optical time domain reflectometer (OTDR) approved by the Engineer shall be used to conduct testing. The OTDR shall be calibrated to sheath (jacket) length, not optical length, by adjusting the unit's index of refraction. Properly trained technicians shall conduct tests.

(i) All OTDR traces shall maximize both the vertical and horizontal scales to the greatest extent possible and still fit the entire trace on the screen.

(j) A cable segment shall be deemed a failure if the total loss exceeds the calculated loss for that length of cable as indicated in Attachment 820-A. A cable segment shall fail if any individual splice loss is greater than 0.1dB, or if any mated connector pair loss is greater than 0.75dB, or if there is any point loss (over less than 1' of cable) of more than 1.0dB.

(k) After the circuit test, a functional test shall be performed. This test shall consist of allowing the system to operate as normal for 30 consecutive days. Any failures shall be repaired by the Contractor at his own expense, and the test restarted.

820.03.05 All switches and breakers shall be operational and the operation of the devices they control verified. That is, the Contractor shall test switches and breakers in the presence of the MDTA electrical inspector to prove and assure that the device (or devices) specified is (are) controlled and no other device (or devices) is (are) controlled. All panel schedules shall be accurate and reflect the final installation.

820.03.06 All GFI protected outlets shall be tested with a suitable tester in the presence of the MDTA electrical inspector. The tester shall be a device that plugs into the outlet and indicates proper wiring of the outlet. A switch on the tester shall be utilized to introduce a ground fault that must trip the GFI device.

820.03.07 All Uninterruptible Power Supplies shall be tested by removal of power sources. Verify proper transfer to battery and backup time consistent with the manufacturers load vs time data for the particular model of UPS. Restore normal power and verify that batteries are charged and normal operation commences.

820.03.08 All PVC conduit fittings, except threaded fittings, shall be schedule 80 and glued and water tight. All GRSC fittings shall be tight fit.

820.03.09 All photo electric controls shall be tested by applying a temporary shade to simulate photometric changes intended to activate the controls. Such testing shall be performed by the contractor in the presence of the MDTA electrical inspector.

820.03.10 All three phase panels, loads, motors, generators, UPS's, and ATS's shall be checked for proper phase rotation and consistent phase termination between termination points. Ie: Phase A is the same Phase at all Phase A termination points and the phase rotation is the same at all points. Such testing shall be performed by the contractor and witnessed by the electrical inspector.

820.03.11 Flexible metal conduit (Greenfield) and liquid tight flexible metal conduit (seal tight), and liquid tight flexible non-metallic conduit may be used as follows. Flexible fabric innerduct and innerduct used for low-voltage and fiber optic systems is not covered by this requirement.

(a) Lengths not exceeding 3' shall be used to connect transformers over 5KVA and motors.

(b) Lengths not exceeding 6' may be used for the final connection of light fixtures used in ceilings.

(c) Lengths not exceeding 6" may be used for the final connection devices that may be subject to minor vibration or minor movement perhaps from temperature expansion and contraction.

(d) Other lengths as clearly specified on the plans or as approved by the Engineer.

820.03.12 Conduit/Cable labeling. Interior cable and raceways shall be permanently labeled at a minimum of every 50 feet, **every 25 feet when view is obstructed, and within 5' of any wall or floor/ceiling penetration** at all junction boxes, terminations, **and within 12" of electrical panel.** Label color shall be Safety Orange with Black Letters and shall follow ANSI (ASME) A13.1 for location and size.

820.03.13 Unless specifically shown otherwise on the plans, wiring derived from different system voltages shall be installed in separate conduits. Wiring of different voltages derived from the same system (i.e. Control wiring) may be permitted to be installed in the same conduit or junction box provided that all requirements of the NEC are maintained.

820.03.14 No wiring other than the primary voltage indicated shall be installed in electrical panels and Safety/Disconnect Switches. Exception may be granted for wiring that terminates on a device within the panelboard or safety/disconnect switch that is integral to the operation of that device. Enclosures for switches or overcurrent devices shall not be used as junction

boxes, auxiliary gutters, or raceways for conductors feeding through or tapping off to other switches or overcurrent devices.

820.03.15 Branch Circuits: Any circuits supplying more than 50% non-linear loads shall have a dedicated neutral conductor

820.03.16 Conduit or tubing 1" and larger shall be provided with a suitable insulating bushing.

820.03.17 Panel Board Labeling. All circuits installed or modified by the contractor in any way shall be properly labeled in the associated panel board panel schedule. This work shall include verifying that the existing load on the affected circuit(s) is also correctly identified. The label shall identify the type of load(s) served (e.g.: receptacles, lighting, appliances, motors, pumps, etc..) and the location (e.g.: room 103, sump pit#1, etc...). Where changes are minor (e.g. Two circuits or less being changed), the existing panel schedule may be modified as approved by the Electrical Inspector. Larger changes shall require a new panel schedule typed, neat in appearance. The new schedule may copy the identifying labels of the old schedule provided that the contractor has not made any changes to those circuits. To clarify, replacing a panel board, moving circuits within a panel board, or similar changes shall be considered modifying the circuit and shall require testing to verify the connections of all such circuits and coordinating the panel schedule with the existing conditions.

820.03.18 Fire Stopping. All penetrations into fire walls or core holes between floors and walls must be properly fire-stopped in accordance NEC requirements for fire stopping. Penetrations into the surface of any firewall or presumed firewall should be only slightly larger than the conduit, cable or cables that will need to pass through it. This will make fire stopping easier and allow the wall to maintain a better over all structural integrity.

820.03.19 Construction Stakeout and Coordination

(a) The Contractor shall coordinate this work with the work of other trades to avoid conflicts. Electrical cables and equipment damaged by the execution of work of other trades shall be completely removed and replaced with new.

(b) The Contractor shall keep an up-to-date set of as-built red lined drawings on the job site. Submit as-built drawings upon completion of the work. The Contractor shall note the exact location of trenches at 100-foot intervals on the as-built drawings by station, and offset from the roadway. The Contractor shall show only the work that is part of the final project on as-built drawings.

820.03.20 Boxes and Cabinets. Unless specified otherwise, junction boxes, pull boxes, disconnect switches, cabinets, and other enclosures installed outdoors and above ground shall

be NEMA 4X rated; except cabinets and boxes requiring ventilation which shall be NEMA 3X rated.

820.03.21 Rodent stopping. All conduits that connect to exterior mounted cabinets shall be stuffed with copper mesh designed and approved for rodent exclusion, and duct seal at the cabinet end point to deter rodent egress through the conduit. The copper mesh shall be installed after all wires and cables have been installed. The mesh and duct seal shall be removable and the mesh and installation and removal technique shall not damage wires or cables.

820.03.22 Conduit Fill. All conduit, new or existing, shall not exceed conduit fill requirements as specified in ANSI/NECA/BICSI-568-2006. Discrepancies shall be brought to the attention of the engineer prior to incorporation into the work.

820.03.23 Existing Conduits. Where existing empty conduits are used, the conduit shall be cleaned by pulling a mandrel of at least 80% conduit fill and a swab through the empty conduit. Any existing pull strings used (empty or partially used conduits) shall be replaced by pulling a new pull string with the new electrical or communications cables.

820.03.24 Bending Radius and Pulling Tension: Wires, Cables, Coaxial Cable, Fiber Optic Cables, and other communications and electrical cables shall be installed and handled in such a way so as not to exceed the manufacturers specified bending radius and pulling tension limits. Where the manufacturer provides installation and handling guidelines, such guidelines shall be followed.

ATTACHMENT 820-A

SAMPLE FIBER OPTIC CABLE TEST REPORT

(To be filled out after installation is complete)

Job Name: **Job ID:**	**Fiber Cable:**
Location (A):	**Location (B):**

ANSI/EIA/TIA 568A: Cable Loss Factor (CLF); 1km=3280.83 feet

3.50 db/km @ 850 nm for 62.5/125 μm MM

1.50 db/km @ 1300 nm for 62.5/125 μm MM

0.40 db/km @ 1310 nm and 1550 nm for OSP SM

0.40 db/km @ 1310 nm and 1550 nm for ISP SM

Connector Loss (CL) ≤ 0.75 db per mated pair of connectors

Splice Loss (SL) ≤ 0.1 db each

To calculate ACCEPTABLE LOSS (db): Multiply cable length x (CLF) + (CL) + (SL) = DB margin:___

Cable Length	Strand No	A to B	B to A	Fiber ID
Feet	1			Blue
850 NM MM	2			Orange
dB	3			Green
	4			Brown
	5			Slate
	6			White
	7			Red
	8			Black
	9			Yellow
	10			Violet
	11			Rose
	12			Aqua

Cable Length	Strand No.	A to B	B to A	Fiber ID
Feet	1			Blue
1300 NM MM	2			Orange
dB	3			Green
	4			Brown
	5			Slate
	6			White
	7			Red
	8			Black
	9			Yellow
	10			Violet
	11			Rose
	12			Aqua

Cable Length	Strand No.	A to B	B to A	Fiber ID
Feet	1			Blue
1550 NM MM	2			Orange
dB	3			Green
	4			Brown
	5			Slate
	6			White
	7			Red
	8			Black
	9			Yellow
	10			Violet
	11			Rose
	12			Aqua

Technician: _____ Date: _____